CLAIMS

add a12

1. Process for treating vulcanized rubber waste, particularly comprising tyres of all sizes and of all types and/or of other worn reinforced-rubber articles such as boots, inflatable boats; this process comprises:

- cutting the materials, particularly the tyres, into fragments from 10 to 25 cm in length;
- attacking, using a molten pure base, the tyres and other vulcanized articles made of rubber and/or polymers, in which base deconsolidation takes place;
- separting the molten base from the deconsolidated solid components;
- neutralizing the deconsolidated fragments;
- separating the liquid from the deconsolidated fragments;
- separating the metallic and synthetic deconsolidated fragments for the purpose of recycling or of reutilization.

2. Process according to Claim 1, characterized by the use of molten pure cast NaOH as the attacking liquid.

3. Process according to either of Claims 1 and 2, characterized in that the said separation comprises sedimentation of the deconsolidated fragments, separated beforehand from the molten base, in a settling and neutralizing liquid, and, after removal of the settling and neutralizing liquid, recovery of the deconsolidated fragments.

4. Process according to any one of Claims 1 to 3, characterized in that it includes recycling the liquid coming from the NaOH.

5. Process according to any one of Claims 1 to 4, characterized in that the molten NaOH treatment temperature is at least 400°C advantageously and preferably 350°C.

6. Process according to any one of Claims 1 to 5, characterized in that the molten NaOH solution is used well below its boiling point.

7. Process according to any one of Claims 1 to 6, characterized in that the deconsolidation treatment takes place in a closed reactor, the materials to be treated completely immersed.

8. Process according to any one of Claims 1 to 7, characterized in that the neutralization uses dilute acids, preferably phosphoric acid, more advantageously waste from certain phosphoric acid solutions.

9. Plant for implementing the process for treating vulcanized rubber, such as tyres, according to any one of Claims 1 to 8, characterized in that it comprises:

- a completely closed system with no atmospheric pollution;
- a device (1) for melting the NaOH in its packaging;
- a reactor (13) into which the waste, consisting of tyres cut into lengths of 10 to 25 cm, and a basic liquid are introduced so as to form an attack medium in which the synthetic materials are deconsolidated from the reinforcements;
- a separating device (19, 20, 21) allowing the attacking liquid to be separated from the deconsolidated fragments;
- a source (24, 25, 26) of neutralizing agent allowing neutralization of the deconsolidated fragments before they are recycled and reutilized;

- a device for the separation of metal neutralized fragments and polymer.

10. Plant according to Claim 9, characterized in that the reactor (13) has closable inlet and outlet openings (17 and 22), stirring equipment (16) and in that the said separating device comprises a filter (21), if necessary unclogged by the compressed-air device (44), capable of retaining inside the reactor the particles greater than 1 mm.

11. Plant according to either of Claims 9 and 10, characterized in that the neutralizing device comprises a tank (23) provided with an inlet communicating with the outlet (22) of the reactor, and with an outlet, the inlet and outlet being closeable, stirring equipment (16) and a filter if necessary unclogged by the compressed-air device in the output line with extension (28), spraying equipment for facility the neutralizing via the line (27).

12. Plant according to one or other Claim 9 to 11, characterized in that the neutralizing device comprises a tank (24) for injection of neutralized liquid and for recovery via the lines (25 and 28).

13. Plant according to one or the other Claim 9 to 12, characterized in that the neutralizing device comprises another tank, source of financial returns by the use of acid waste (26), connected to a mixing unit (27), on the line (25).

14. Plant according to one of the other Claim 9 to 13, characterized in that the devices for cleaning the precipitates and small particles, during treatment, are characterized by the equipment (38, 39, 40, 41, 42, 43).

15. Plant according to one or the other Claim 9 to 14, characterized in that a device (31) for transporting

the deconsolidated materials comprises magnetic separation of the metallic materials (32), possibly combined with an eddy-current system for the non-ferrous materials.

16. Process and plant according to one or the other Claim of 1 to 15, allowing recycling of the synthetic materials coming from worn tyres, with a pulverulent appearance, having polymeric characteristics propitious to recycling, into the starting material, the tyres. Other advantageous and non-limiting uses ought to appear.